PVP 22

Code: 22ECMC1T3

I M.Tech - I Semester – Regular Examinations - MARCH - 2023

ADAPTIVE AND SMART ANTENNAS
(MICROWAVE & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 60

Note: 1. This paper contains 4 questions from 4 units of Syllabus. Each unit carries 15 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	What are the features of a smart antenna system? Write benefits of smart antennas. Also mention few applications of smart antennas in wireless systems.	L2	CO1	7 M
	b)	Write a brief note on MUSIC DOA Estimation algorithm.	L2	CO3	8 M
OR					
2	a)	How mutual coupling between the antennas in an array affect the desired reception of the array? Illustrate the method by which the coupling effect is normally modelled.	L2	CO1	8 M
	b)	What are the different types of Smart Antenna configurations and also give the architecture of a Smart Antenna System?	L2	CO1	7 M

UNIT-II					
3	a)	Explain Direct Matrix Inversion method of beamforming.	L2	CO2	7 M
	b)	Describe how the weight vectors of adaptive array are adjusted by constant modulus algorithm.	L2	CO2	8 M
OR					
4	a)	Explain the concept of adaptive antenna system by considering the case of beam forming.	L2	CO2	7 M
	b)	Explain the following in the context of smart antennas : a) Minimum Mean Square Error (MMSE) b) Least Mean Square (LMS) algorithms for optimal beamforming.	L2	CO2	8 M
UNIT-III					
5	a)	Explain a planar array smart antenna system with M x N identical elements that operates at 20GHz for Mobile Ad-Hoc Network considering the mutual coupling effects.	L2	CO3	10 M
	b)	Give the overview of Direction-of-arrival (DOA) Algorithms.	L2	CO3	5 M
OR					
6	a)	Discuss the concept of adaptive beamforming.	L2	CO3	7 M
	b)	Explain Trellis-coded Modulation for adaptive arrays.	L2	CO3	8 M

UNIT-IV					
7	a)	Give an overview on Space time processing.	L2	CO4	7 M
	b)	Describe discrete space time channel and signal models used in M transmitting and N receiving antenna system.	L2	CO4	8 M
OR					
8	a)	Give the Single user and multi user data rate limits with the appropriate expressions.	L2	CO4	7 M
	b)	Explain the principles of Rake receiver in detail.	L2	CO4	8 M